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MATHEMATICS NEEDED IN ELEMENTARY CLOTHING

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Since many pupils in elementary clothing classes seem to be handicapped by their inability to handle the mathematics involved, this study was undertaken to determine definitely what mathematical concepts and processes are used in a course in elementary clothing, and the degree of difficulty to which each process is carried. The study will be used as a basis for constructing tests and exercises that will locate and remove such handicaps.

The study is based on an examination of Baldt's Clothing for Women, the text used in Stephens Junior College to supplement the lectures in elementary clothing. A careful examination of the text was made and all words and expressions that are distinctly mathematical or that imply mathematics, were classified and their frequency determined. The standards for determining whether or not a word or expression should be considered as mathematical or implying mathematics were the principles set forth and used by Lewis W. Williams of the University of Illinois in a similar study of "The Mathematics Needed in Freshman Chemistry."[1] The results of this examination are shown in the accompanying tables.

Table I gives the mathematical concepts, a reading knowledge of which is necessary for understanding the text. Of the one hundred twenty-eight concepts listed, fifty-six or about 42 per cent are distinctly geometrical in nature and the rest are arithmetical.

Table II shows that, with one exception, all the denominate numbers used are those with which a girl becomes familiar early in her home experience as well as early in her elementary schooling. The use of the "head" as a unit of measure will no doubt be new to the girl, but its meaning and use is fully explained in the text. This table also shows that "long measure" and "United States money" are the two

[1] School Science and Mathematics, October, 1921, p. 654.

most important measures used in elementary clothing, and it is interesting to note the extensive use of the *inch*, the moderate use of the *yard* and the entire absence of the *foot* from the list.

TABLE I

Mathematical concepts

Add (or adds)	23	Estimate	2	Product	1
Added	3	Even numbers	2	Proportional	9
Adding	4	Fifth	2	Proportionate	6
Additional	1	Figure	1	Pyramid	1
Amount	2	First	180	Radiating lines	3
Angle	4	Five-pointed star	1	Radius	12
Apportion	3	Four-sided	1	Rectangle	6
Approach a straight line	1	Fourth	8	Remainder	12
Approximate	3	Height	20	Right angle	39
Area	17	Horizontal	15	Round	6
Average	2	Indefinite length	8	Ruler	14
Balance	2	Infinite number	1	Second	68
Breadth	1	Intersecting lines	6	Secondary	1
Broken line	1	Length	132	Single	30
Calculate	15	Less (minus)	2	Sixth	1
Center	311	Less than	1	Spaces (areas)	1
Center line	4	Line (or lines)	613	Square	30
Circle	5	Line AB, etc.	12	Straight edge	1
Circular	68	Mathematically	1	Straight line	30
Compute	1	Measure	285	Subtract	5
Couple	2	Measurement	9	Sum	1
Curve	98	Measuring	13	Tailor's square	3
Cylinder	4	Middle	7	Take from	5
Cylindrical	1	Minus	31	Tape measure	15
Decrease	4	Multiply	5	Tertiary	1
Deduct	6	Nothing (zero)	9	Third	12
Depth	82	Numbers	45	Three-fold	1
Diagonal	26	Numeral	2	Times	22
Diagonals	1	Oblongs	3	Total	3
Diameter	3	Once	18	Triangle	1
Diamond	3	Oval	2	Triangular	1
Difference	3	Pairs	2	Triple	4
Dimensions	1	Parallel	21	Twice	51
Divide	18	Per cent	20	Two-fold	1
Divided	3	Percentage	4	Unequal	1
Dividing	2	Perpendicular	3	Uneven numbers	2
Division	9	Pivot (center of circle)	3	Vary (or varies)	6
Divisions	20	Plus	77	Vertical	12
Double	37	Point	107	Whole (sum)	1
Equal (or equals)	470	Point A, etc.	15	Width	171
Equally	1	Points of intersection	4	Yard stick	1
Equal parts	3	Primary	2	Zero	1
Equidistant	1	Prism	3		

TABLE II

Denominate numbers

Cents..... 3	Hour..... 5	Score..... 1
Century..... 5	Inch (inches).....1399	Skeins..... 3
Day..... 4	Minute..... 2	Week..... 4
Dollars.....454	Moment..... 1	Yard..... 70
Dozen..... 8	Month..... 1	Year..... 12
Head..... 14	Pounds..... 2	

TABLE III

Inches

INCHES	INTEGERS			MIXED NUMBERS			COMMON FRACTIONS								DECIMALS
Expressed in.....	One place	Two places	Three places	One place	Two places	Three places	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{1}{16}$	0.5
Words.....	427	33	0	48	0	0	129	178	82	56	37	15	2	9	0
Figures.....	22	143	1	25	61	0	7	7	10	11	9	7	8	0	12

TABLE IV

Common fractions (not included in Table III)

	FRACTIONS						
	Half	Fourth	Third	Sixth	Eighth	Tenth	Twelfth
Words.....	162	45	23	27	12	7	6
Figures.....	0	2	0	0	0	0	0

Table III gives in detail the use made of the inch. Length in inches in about 43 per cent of the total number of cases is represented by a common fraction, and in 33 per cent of the cases by a one place integer. It is interesting to compare the fractions in this table with those in Table IV, which gives all the common fractions used in the text and not included in Table III. One finds that the fractions in these tables do not differ in size but that they differ in two other respects, at once interesting and significant. These points of difference lie in the "divisions of the whole" which the denominators represent and in the operations performed upon the fractions. The denominators in Table III correspond to the divisions on the ordinary ruler or linear scale—halves, quarters, eighths, sixteenths; while the denominators in Table IV correspond in 81 per cent of the cases to the divisions most easily and frequently made by the human eye and mind—halves, thirds, fourths, and in the other 19 per cent of cases, the denominators are multiples of these divisions.

The operations performed upon the fractions in Table III are, in general, addition, subtraction, multiplication (in which the inch, a concrete number, is the multiplicand) and, in a few cases, division and reduction. Almost the only operation performed with the fractions in Table IV is multiplication, in which the fraction plays the rôle of multiplier.

TABLE V

Money

	AMOUNTS				
	Less than $1.00	$1.00 to $10.00	$10.00 to $100.00	$100.00 to $1000.00	$1000-
Whole dollars	0	175	8	5	1
Mixed dollars	0	71	1	2	0
Decimal (cents)	191	0	0	0	0

Table V shows that the amounts of money used are small; $1200 is the largest amount and it occurs but once, while 96 per cent of the cases represent sums of money less than $10 in value. The operations with money, written as decimals, are limited to the addition of three to forty addends ranging from $.01 to $25.00, and to the multiplication of small decimals (cents) by one place whole or mixed numbers or by small common fractions. (See Table VI.)

TABLE VI

U. S. Money, Multiplication

MULTIPLIER	MULTIPLICANDS		
	Dollars	Dollars and cents	Cents only
Integer (one place)	9	0	24
Mixed number	0	0	13
Fraction	0	0	1

TABLE VII

Cardinal numbers (not included in previous tables)

	INTEGERS				
	Zero	One place	Two place	Three place	Four place
Words	1	523	8	0	0
Arabic figures	2	566	161	289	30
Roman figures	0	71	6	0	0

One of the two chapters involving percentage presupposes a knowledge of the four fundamental operations with decimals. This chapter deals with the distribution of a $1200 budget. Two cases of percentage are used, (1) finding a certain per cent of $1200, and (2) finding what per cent a certain sum of money is of $1200; the operations involved are (1) multiplication of a four place integer by a two place decimal, and (2) division of a two or three place integer by a four place integer. The other chapter involving percentage is concerned with the absorbent quality of fabrics, given in per cents. To understand this chapter elementary students need to know only the meaning of the term "per cent."

There is a chapter on color in which use is made of symbols involving letters and numerical superscripts; however, this symbolism, though akin to algebraic symbolism, is peculiar to the theory of color and is fully explained in the text.

Five chapters, or about one-fourth the number of pages in the text, are concerned with the drafting and use of patterns. The directions for drafting patterns are stated in the form of equations written out in words, and illustrated by geometric figures. There are four hundred thirty of these equations and they represent arithmetical problems to be solved, geometric constructions to be made, or more often, combinations of the two. Relatively few processes are required for the solution of these problems, but every possible combination of these processes appears. The exact number of processes required, and the degree of complexity involved in drafting any one pattern cannot be fully determined, for, after drafting a pattern to the set of standard measurements given in the text, each student is required to draft a pattern to her own measurements, and her measurements may be such as to simplify, or to further complicate, the given problem.

The most complicated problem given in the text is the "Rule for Finding the Radius (of a circular flounce): Multiply the width of the flounce at the top by the depth; divide the product by the difference between the width at the top and bottom, the result being the radius of the curve at the top" (p. 124). Illustrations of the simplest, the most common, and (with the exception of the rule quoted above) the most complicated, types of directions are:

1. HM equals five inches.
2. AE equals one-sixth neck measure plus three-eighths inch.
3. AB equals one-half hip measure minus one-eighth of one-half width around bottom.

The arithmetical processes and geometric constructions a knowledge of which is necessary to carry out the four hundred thirty directions of this type are:

1. All the processes involved in the addition, subtraction, multiplication, and division of small integers, mixed numbers, and common fractions with small denominators.
2. The reduction of yards to inches and inches to yards.
3. To draw a line of given length.
4. To draw a line parallel to a given line at a given distance from it.
5. To draw a line perpendicular to a given line from a given internal or external point.
6. To draw a circle, or arc of circle, having given the center and radius of the circle.

If we add to this list the processes involved in performing the four fundamental operations with decimals (not exceeding four places in the integral, and three places in the decimal part) we shall have all the processes and constructions encountered in the text.

It is quite obvious that pupils in elementary clothing classes in high school or college should have met with these elementary and fundamental processes and with most of the geometrical as well as arithmetical concepts by the time they have completed the elementary school. Therefore, exercises designed to remove this type of handicap should consist of reviews of the methods of performing these operations and of abundant drill in simple applications within the rather narrow range indicated in this study.

It is quite probable that a girl will have had plane geometry before taking elementary clothing. It is also quite probable that even if she remembers the few simple constructions needed they will not serve her purpose, for the method of constructing parallel and perpendicular lines in the sewing laboratory is by means of the tailor's square and not the classic "straight edge and compass" method which is the only method taught in many plane geometry classes. Difficulties with these constructions will be overcome most effectively and most economically when the teacher gives instructions and drill in the use of this new tool, the tailor's square.

AN ANALYSIS OF TEXTBOOKS IN CLOTHING AND TEXTILES

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The purpose of the investigation reported in this paper is to trace the development of the subject matter of clothing and textiles as reflected by textbooks, and to ascertain the persistency and recurrence of fundamental problems within that field as determined by such texts. It is hoped that the material herein presented may make a contribution to the information concerning the printed subject matter within this field, and may, by summarizing such information, serve as a starting point from which further work may proceed. A study of textiles and clothing textbooks may picture the development of the subject, and may also present facts concerning textbooks in current use which should function in the evaluation and selection of such texts.

A recent publication[1] points out the importance of the textbook as a factor directly influencing the success of teaching in the average classroom, an importance which is increased in the light of our inadequate teaching staffs in America. The writer further states that the textbook "is an aid in instruction because it is a convenient means for having at hand necessary data, ... because it presents a definite organization of material, ... because it furnishes the teacher a means of selecting pertinent subject-matter." According to Maxwell, the following elements should be given consideration in the selection of textbooks: content and organization, needs of users, purpose of author, accuracy and reliability of material, relative emphasis on the several aspects of the subject, amount of material included, illustrations, and helps, such as index, list of references, charts, and diagrams. Other considerations of lesser importance are the reputation of the author, and date of copyright. A third group of standards deals with the mechanical construction of the book, its appearance, type used, and size of page.

One of the earliest textbook studies was the analysis of history texts begun by Bagley and Rugg[2] in 1914. Since that date Jones[3] has studied

[1] Maxwell, C. R., The Selection of Textbooks. Boston: Houghton Mifflin Co., 1921, p. v, vii, 4, 5, 62–75.

[2] Bagley, W. C. and Rugg, H. O., Univ. of Ill., School of Educ. Bull. no. 16, 1916, p. 8 ff.

[3] Jones, R. G., The 14th Yearbook of the Natl. Soc. for the Study of Educ., Part I. Bloomington, Ill.: Public School Pub. Co., p. 38 ff.

primer vocabularies; Jessup and Coffman,[4] arithmetic; Monroe,[5] arithmetic; Rugg and Clark,[6] ninth-grade mathematics; Housch,[7] second-year readers; Woody,[8] spellers; and Trilling and others,[9] home economics.

METHOD OF ANALYSIS

Selection of books. A list of clothing and textiles textbooks was prepared from bibliographies, references, and book lists published by various colleges and libraries, or included in bulletins, texts, or reference books. With the few exceptions noted below, all of those books retained for analysis contained statements by the author indicating that they were intended for use as textbooks. Three exceptions were made, two of these being books which belonged to a period of which there were only few representatives, and which in form and content closely resembled a textbook, and one being a book which is known to have been used as a text. The final list included forty-three books. All of these were American publications, with the exception of four, which were English, but which were published by firms maintaining large branch establishments in this country, and which have apparently been used widely enough to be carried in stock by the American branch of the firms.

General data recorded. The following general facts were recorded for each book: date of publication, author, title, publisher, place of publication, purpose of book, number of pages, average number of words per page, number of graphs, tables, photographs and drawings used, character of legends appended to illustrations, and style of writing.

Analysis of subject matter. As a result of trial and error experimentation with the first few books studied, and of teaching experience with the subject matter involved, the following scheme for analysis was adopted and proved to be usable for all the books. The whole field was divided into three groups: clothing, textiles, and miscellaneous, which were in turn divided into fourteen topics for gross comparison, and these subdivided into fifty-four subtopics for purposes of detailed comparison

[4] Jessup, W. A. and Coffman, L. D., The Supervision of Arithmetic. N. Y.: The Macmillan Co., 1916, p. 110 ff.

[5] Monroe, W. S., The 16th Yearbook of the Natl. Soc. for the Study of Educ., Part I. Bloomington, Ill.: Public School Pub. Co., 1918, p. 112–127.

[6] Rugg, H. O. and Clark, J. R., Univ. of Chic. Press, Supplementary Educ. Monographs, Vol. II, no. 1, Apl. 1918, p. 26 ff.

[7] Housh, E. T., The 17th Yearbook of the Natl. Soc. for the Study of Educ., Part I. Bloomington, Ill.: Public School Pub. Co., 1918, p. 40 ff.

[8] Woody, C., Jour. of Educ. Research, I: 119–128. Feb., 1915.

[9] Trilling, M. B. et al., Home Economics in American Schools. Chicago: Univ. of Chicago Press, Supplementary Educational Monographs, Vol. II, No. 6, Oct., 1920, p. 1 ff, 25, 26.

of subject matter, as well as for a satisfactory analysis of the contents of the books.

The fourteen topics used were:

1. Clothing—general instruction and supplies; patterns, drafting and draping; applied design; sewing processes; garment construction; care of clothing; millinery.

2. Textiles—textile manufacture; textile fibers; fabrics and their uses.

3. Miscellaneous—foreign material; blank pages; bibliography; index.

The subtopics were carefully defined and the subject matter included in each was listed in detail, so that no confusion could arise in the course of the analysis. Following are examples of these subtopics: drafting and pattern making, principles of clothing design, sewing stitches, seam finishes, underwear, mending, weave structure, characteristics of fibers, tests for fabrics.

Tabulation of data. The above mentioned 54 subtopics were used in analyzing the 43 books. The total number of pages, including illustrations, and the number and size of illustrations were recorded for each subtopic, size of illustration being determined on the basis of the number per page. These data were summarized for each of the fourteen topics and the following information tabulated: total number of pages, number of pages of text, number of pages of illustrations, and number of illustrations both on a basis of the number of words per printed page and on the basis of a standard page, for which the average of the first 17 texts analyzed, 350 words per page, was chosen. As a third basis of comparison, the following percentages were computed for each topic and included in the tabulation—total (text and illustrations), text, illustrations. The above data supplied material for comparisons and summaries.

It was deemed permissible to compare all these books, although the aims and purposes were not identical, inasmuch as clothing and textiles textbooks, like texts in other fields, have been rather generally used with considerable disregard of the purposes outlined by the author.[9]

GENERAL CHARACTERISTICS OF THE BOOKS

Types of schools provided for. About half of these text books have been planned for the grades. Twelve of the 43 were intended for one or more of the following types of institutions—high school, normal school, and college. The rest were planned for varied uses, such as trade schools, vocational schools, continuation and technical courses, and evening schools. With the introduction of clothing and textiles into various

types of educational institutions, the work outlined in textbooks has been changed gradually, so as to meet the changing demands of home economics curricula.

Period of publication. The dates of publication range from 1882 to 1921. Twenty-seven, or 63 per cent, were issued during the decade ending with 1919. The rest of these texts were distributed as follows: one before 1890, five between 1890 and 1899, eight between 1900 and 1909, and two after 1919. The period of greatest productivity to date has been the ten years between 1910 and 1920, a period which coincides, probably, with the development of the subject in the school program.

Organization. A survey of the chapter headings of six texts devoted wholly or largely to textiles shows, in spite of apparent dissimilarity, certain points of similarity. Methods of textile manufacture, both primitive and modern, and the study of the production and manufacture of textile fibers are included in all six lists. Finishing processes, such as bleaching and dyeing, and laboratory tests are found specially noted as chapter headings in five. Other subjects occur less frequently. Chapter headings are indicative of variations in organization, but are not measures of variation in the actual subject matter content of the books. The order of subject matter arrangement, as well as the content, was undoubtedly influenced by the purpose of the book. The variety of purposes already noted, of number of large divisions used, and of character and order of such divisions, would probably be found to be quite as marked among the 38 books devoted wholly or in part to the study of clothing as it is in these five.

Style. Most of these texts are expository, or partly expository and partly descriptive, in style. In 1900–1909, one was written in question and answer form, and the next decade produced two books which were developed as narratives. This would seem to indicate that exposition is generally accepted as the most satisfactory form in which to present clothing and textiles subject matter in textbooks.

Illustrations. (1) Number. Twenty-six of the 43 texts have not more than 100 illustrations each, although of the 27 published during 1910–1919, 13 exceeded 100 illustrations per book, three of them having totals of more then 300 illustrations.

(2) Size. Less than a third of all the illustrations have occupied more than a third of a page, while more than two-thirds have occupied a fourth of a page or more.

(3) Kind. The use of photographs has increased from 3 to 44 per cent of all illustrations since 1900. The character of both drawings and photographs has shown a marked improvement.

(4) Graphs and tables. The use of graphs is limited but seems to be increasing, nine only being found and those occurring in the 35 books published from 1900 to 1920. Tables have been used more commonly than graphs, and also seem to be increasing gradually in number. Between 1910 and 1919, 10 of the 16 books in which tables were used, contained 82 out of a total of 131 tables.

(5) Legends. The use of explanatory legends has predominated throughout the whole period, no gradual development in this feature having been observed.

Bibliographical material. It is of interest to note the relatively small amount of bibliographical or reference material which has been used. Thirty-two of the texts contained no bibliography or reference lists, the two latest contributions in this field being included. This may possibly be due in part to the scarcity of adequate reference material for clothing work, to the technical nature of much of the reference material available in the field of textiles, or to the maturity of student for whom the text is planned.

Indexes. Indexes have been used with gradually increasing frequency during the decades studied, although it should be noted that 37 per cent of the textbooks published between 1910 and 1919, when the use of the index was most marked, contained no index.

These changes in certain general features are probably manifestations in this field of the general development to be observed in textbook making. They reflect our increasing knowledge of the use of illustrations, both as to kind, size, and number, of the functions and value of bibliographies and indexes, and of other general features of a text.

SIZE AND SCOPE OF THE BOOKS

Size. The size of the books has been measured by the number of pages in the book, the number of words per page as printed, and the number of 350 word pages, a size selected as standard for purposes of comparison. Blank pages and those devoted to foreign material[10] have been omitted.

The number of pages per book has gradually increased during the two decades following 1900. Previous to that date none exceeded 200 pages. The majority of these texts for 1910–1919 contain from 200 to 300 pages; the maximum size is one 500–600 page book, written in four

[10] "Foreign material" has been used to include other topics which are not a part of the subject matter of textiles and clothing, such as directions to teachers, making beds, interior decoration, etc.

parts. The clearly marked tendency to increase the number of pages is evidence of an increasing volume of subject matter which has grown with the development of home economics, and of a freer use of illustrative material. Such growth of subject matter may in part be due to an increased use of applications of science, economics, and art to the problems of clothing and textiles.

The number of words per page is determined by the size, style, and placement of the type used, as well as the dimensions of the page. No record was made of these factors, but the variation in them might be safely assumed to parallel that of textbooks in other subjects for similar grades. The average for the whole group is very nearly 350 words per page and there has been relatively little change in the size of page used, as measured in this manner.

Compared on the basis of the 350 word page, the size of these books has markedly increased. This may have been partially due to a wider introduction of the subject in schools, to its introduction into increasingly diversified types of schools, or to the added interest in vocational education and the resultant demand for literature relating thereto.

Scope. Textiles and clothing textbooks have been developed as distinctly separate units in the literature of home economics. Although foods courses have been associated with clothing courses in school curricula for several decades, but three of the texts studied contain sections devoted to foods. Three books include materials for other phases of home economics, of which shelter, home equipment, and care of the baby are examples. Numerous texts may be found in which clothing and textiles have been treated separately, or in which the two have been somewhat correlated. This condition is shown by the fact that 19 of the 43 books devoted 90 per cent or more of their space to clothing work, five devoted 90 per cent or more space to textiles, and the remaining 19 contained varying amounts of the two.

Textiles first appeared in these books in combination with clothing work during the 1890 to 1894 period, the first book dealing primarily with textiles having been published in 1912, and all of the five textiles texts belonging to the decade ending with 1919. The introduction of textiles is of later origin than that of clothing work, and its recognition in these textbooks has been increasing gradually.

Further evidence of this development is found in the increasing number of 350 word pages contributed to clothing and textiles, during the five-year periods studied, with the exception of a slump during 1900–1904 in the textiles contributions.

The kind of clothing work offered has changed quite as much as the quantity. Two types of sewing work may be said to have been developed–that in which sewing processes are taught by means of samplers or models, and that in which the experience is acquired through the construction of garments or other useful articles. Excluding the strictly textiles texts, the remaining books have outlined clothing problems of either one or both of these types. During the whole period there has been a tendency to eliminate work on samplers and to introduce construction work in its place. During the 1910–1919 period three of the clothing books dealt with samplers, seven with samplers and garments, and twelve with garments only. Such a transfer of emphasis would seem to have followed the increased knowledge of educational psychology and of efficient methods of presentation of subject matter.

(*To be concluded*)

HOME ECONOMICS TEACHING LOAD

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The School of Home Economics of the Utah Agricultural College, in an endeavor to establish the teaching load in accordance with the practice of other institutions giving work leading to the Bachelor's Degree in Home Economics, sent out the following questionnaire:

1. How many students are registered this year in your institution?
2. How many women are registered in the entire institution?
3. How many women are registered in home economics?
4. How many members are there in your home economics staff?
5. What is the range of clock hours per week spent in the class room by the members of your home economics staff; that is, what is the smallest, the average, and the greatest number of clock hours per week for the members of your staff?
6. Is there a definite or uniform difference in the teaching load when it is lecture work as compared with laboratory work only, or with both kinds of work done by each member?
7. What is the teaching load in clock hours per week for those of your staff members having administrative responsibilities?
8. What is your opinion as to the size of the teaching load of your home economics staff members; that is, is it too light, too heavy, or a reasonable one?
9. How does the home economics staff members' teaching load compare with that of faculty members of other departments of your institution?

The replies from 26 institutions are summarized in the chart.

Year 1921

INSTITUTION	HOME ECONOMICS TEACHING LOAD						
	Registration						Minimum
	Total	Women	Home Economics majors	Per cent of women in Home Economics	Number in Home Economics Staff	Ratio teaching staff to students	
Washington State University	4,673	Not determined. About ½ of total	185 majors. 400 more 1 lecture a week on food. 50 elect various home economics courses	(?)	Not answered	(?)	15
Washington State Agricultural College	1,929	678	Majors 129. Total in classes 356	19.0	9 and head. 2 of whom have charge of student feeding and do part time teaching	1:12.9	One teacher trainer 2 hours methods and 4 high school classes daily. One in practice cottage 10 hours class room
Oregon Agricultural College	3,400	1,011	529	52.4	28	1:18.8	19
University of Montana	1,153	540	About 100	18.5	2	1:50.0	
University of California	10,000	5,000	About 400	8.0	8 full-time, 3 half-time	1:42.1	9
University of Nevada	543	188	29	15.4	2 full-time, 1 half-time	1:10.6	14½
University of Idaho	1,200	500	50	10.0	6	1:8.3	18

and 22

TEACHING LOAD IN CLOCK HOURS			HOME ECONOMICS TEACHING LOAD	
Maximum	Average	Head's	Head's opinion of work	Remarks
26		Not answered	Very fair	Definite uniform load throughout University. 15 hours full schedule. Lectures to 40 or more = 1½ hours. To less than 40 = 1 hour. 2 laboratory hours = 1 hour except in Home Economics = 1½ hours since first ½ hour in Home Economics laboratory is recitation. No distinction in any way between Home Economics and other departments
16 to 19	16 and 17 hours for those having administrative duties	4 hours	Load should be about 20 hours, no more than 22 with lecture and laboratory. This equals about 12 credit hours	College trying to set standard: 1 lecture hour equals 2 hours laboratory On this basis instructor should carry 16 credit hours a week. Home Economics on same basis as other laboratory courses
25	23	5 to 7 hours	Fairly reasonable	Lectures to normal size sections—1 teaching load hour. To large sections = 1½ teaching load hours. Laboratory = ½ teaching load hour. Home Economics load lighter than average
	About 24	24 hours	Both staff members have lecture and laboratory work and also administrative work. Load *entirely too heavy*	In College of Liberal Arts load much lighter than in Home Economics; in all Science departments load as heavy and somewhat heavier
14	11	Same as those without administrative duties	On the whole reasonable. Equitable with that in other University Departments, in so far as comparison is possible	Teaching load laboratory: lecture :: 2:1. Varies with type of course; every member of staff both lecture and laboratory
16½		14 hours	Reasonable	No difference in load if lecture or laboratory or both. Home Economics load compares favorably with that in other departments
35	26	About 15. Varies greatly	18 to 22 hours would be reasonable	Home Economics lighter than in other departments. Load varies if both lecture and laboratory

Year 1921 and 22

INSTITUTION	HOME ECONOMICS TEACHING LOAD						
	Registration						
	Total	Women	Home Economics majors	Per cent of women in Home Economics	Number in Home Economics Staff	Ratio teaching staff to students	Minimum
University of Wyoming	508	237	36	15.1	3 and student assistant	1:12.0	16
Colorado Agricultural College	863	249	209	83.5	7 full time, of whom 2 are part time. Student assistants	1:29.7	Practice house 2 lectures—6 credits a section plus 3 dietetics lectures
University of Utah	About 2,555	About 896	120	13.3	5, of whom 1 part time	1:24	12
Agricultural College of Utah	1,123	272	131	48.2	6 full-time 2 one-half time	1:18.7	11 in fall, an exception. 15 or 16 usually
North Dakota Agricultural College	835	216	25 sub-collegiate 49 collegiate	34.2	5	1:14.8	15
Kansas State Manual Training Normal	1,320	About 700	College.....100 Others.....143 Total.....243	34.7	7	1:34.7	18
University of Maine	1,226	283	61	21.5	4	1:15.2	11–16

—Continued

TEACHING LOAD IN CLOCK HOURS			HOME ECONOMICS TEACHING LOAD	
Maximum	Average	Head's	Head's opinion of work	Remarks
22		Same as others	Head's too heavy. Rest reasonable, except too many different preparations	No difference in load when lecture and laboratory work done. Home Economics load about average. Certain others lighter or heavier
1, 22 hours laboratory. 1, 17 hours laboratory and 5 lecture. Assistants 12 hours	18 and 20 (median hours)	2 lectures, one-half time to field work supervising vocational Home Economics	With one exception, sufficient student assistance to make load reasonable	Load compares favorably with that in other departments. Until recently too heavy
22		More than some of instructors. Equals any except training school teacher	In two cases too heavy	Load heavier when both lecture and laboratory. In most cases compares favorably with other departments. (First two years of college work only given)
22	16 to 18	11 hours fall; 15 to 18 in winter and spring	10 to 12 hours for head so long as classes 8 to 30 in number, reasonable. 15 to 18 heavy if both becture and laboratory and some administrative duties. 20 to 22 heavy but possible if laboratory only and no administrative duties	Best quality of work possible only when load not overheavy, present load needs lightening. About same as other departments
26	18	5 hours	Reasonable. Positive work always strengthened when load not too heavy	More hours in load if laboratory only. Home Economics among lighter of load but many same load
25	About 20	15; again, 9 plus cafeteria supervision	Reasonable, except at times when outside calls, banquets, lectures, designing, must be done	Home Economics attempts to make difference in load if work both lecture and laboratory. Home Economics longer hours than in other departments, since so much laboratory work
14-19		5 to 10 hours plus practice teaching	Reasonable except in case of instructor having 7½ hours and practice house supervision. Too heavy	No difference made for lecture and laboratory work both. Load same as other departments

Year 1921 and 22

INSTITUTION	HOME ECONOMICS TEACHING LOAD						
	Registration						Minimum
	Total	Women	Home Economics majors	Per cent of women in Home Economics	Number in Home Economics Staff	Ratio teaching staff to students	
Iowa Agricultural College	3,896	983	810	82.4	53 resident, 11 extension	1:15.2	19
University of Iowa	About 5,000	About 2,000	150	7.5	5	1:30	12
University of Kentucky	1,468	478	98	20.5	8	1:12.2	8
University of Indiana	2,301	1,139	125	10.9	8	1:15.6	8
Purdue University	2,700	398	360		10 resident, 5 extension, 1 experimental station	1:36	11
University of Minnesota	Not answered			(?)	24 full-time 6 one-third or more time	(?)	10
Pennsylvania State College	3,136	322	147	45.7	13 of whom 10 full-time	1:10.1	13

—Continued

TEACHING LOAD IN CLOCK HOURS			HOME ECONOMICS TEACHING LOAD	
Maximum	Average	Head's	Head's opinion of work	Remarks
24	21	½ to ¾ for each having administrative duties	Reasonable	No difference in teaching load if both lecture and laboratory. Teaching loads of all departments on file in President's office
19	15	19 hours	18 or 19 hours, load too heavy. Should not exceed 15 hours or 12 hours if research work done by instructor to insure best results	No difference in load when lecture and laboratory but acting head thinks there should be. So long as load below 18 hours, compares favorably with other departments
25	15.5	8	25 hours too heavy, 15 to 18 satisfactory	Lecture and laboratory work both done by each member. Load about same as in other departments
	12 credit hours in summer school	8	Reasonable	Fewer hours than modern language. Difficult to give 12 credit hours (value of credit hours not given in letter) to instructor teaching many laboratories. Give credit for account keeping, marketing, travel, time for lectures off campus
23	15	4 lecture hours	Reasonable except in one case too heavy. Teachers do better work when reasonable amount of work to do	No difference made in instructors load when both lecture and laboratory, but more laboratory assistance when lecture work heavy. Home Economics professors and instructors heavier load than in other departments. Laboratory assistants load about same
22	18	All having administrative duties lighter than others by 2 to 4 hours or more. Head's not specifically stated	So much depends on quality of teaching which instructor wishes to do, as to amount she can efficiently handle. Head almost hesitates recommending any amount of work as reasonable or unreasonable	10 to 12 credit hours = full-time teaching load, 1 lecture hour = 1 credit hour, 2 lecture laboratory hours = 1 credit hour, 3 laboratory hours = 1 credit hour. Home Economics load compares favorably with other lecture courses. Customary to start instructor on 2, 5 hour lecture-laboratory course. Yet no hard and fast rule
17		None first semester. Second, 3 teaching hours and 3 days in field supervision first 6 weeks	Reasonable. Head's field supervision first necessary this year	Load on average with other departments

Year 1921 and 22

INSTITUTION	HOME ECONOMICS TEACHING LOAD						
	Registration						
	Total	Women	Home Economics majors	Per cent of women in Home Economics	Number in Home Economics Staff	Ratio teaching staff to students	Minimum
University of Missouri	3,794	962	320	33.3	13 of whom 3 half-time	1:22.1	10 lectures
University of Wisconsin	7,344	3,545	275	7.7	27	1:10.2	16
Ohio State University	7,639	1,982	314	15.8	14	1:22.4	2 plus in innumerable conferences
Cornell University	5,342	1,123	286	25.4	Teaching....22 Extension....17 Administration.....24 Total.....60	Teaching 1:13 Teaching and Administration 1:6.4	
University of Illinois	9,084 with Chicago schools	2,097	417	27.1	Teaching 18, cafeteria 1, student laboratory assistants 2, extension 7	1:23.1	2 members no class room work. Others: 3, 5, 7 hours
University of Chicago	6,215	2,901 with extension and night classes	110	3.7	7 full-time, 38 part time, 6 in institutional department do some teaching also	1:15.7	8

—Concluded

TEACHING LOAD IN CLOCK HOURS			HOME ECONOMICS TEACHING LOAD	
Maximum	Average	Head's	Head's opinion of work	Remarks
20 laboratory	10 credit hours	About one-half-time teaching load	As light as should be. Light in order to put in research and outside activities	1 lecture hour = 1 credit hour, 2 laboratory hours = 1 credit hour. Average load in most other departments 12 hours
20		Not specifically stated. No reduction for administrative duties	Reasonable	1 lecture hour = 1 credit hour, 2 hours laboratory = 1 credit hour. Home Economics load slightly heavier than in other departments
21	14	Average 11 hours for each one having administrative duties	Reasonable for those without administrative duties. Too heavy for those having administrative duties	No comparative study of Home Economics load with that in other departments has been made
No attempt to organize work by clock hours. Feel get best work and greatest initiative from giving staff members complete freedom in planning amount of their work			No load should be more than 8 periods a week. This, if all laboratory 2½ or 3 hours very heavy	Burdens carried under different conditions so vary that clock hours do not tell tale. Purposely avoid stating among selves what is normal program
29 practice teaching	Others: 10, 12, 13, 15, 18, 21	Definite statement not possible	Reasonable. Though no deduction from clock hours warranted because of varying nature of work. Each person and each bit of work requires individual handling	No means for comparing Home Economics load with that in other departments. Traditional opinion which calls 16 hours teaching schedule cannot be general rule that fits all cases
15	12	About 6 assistants for laboratory work	Thoroughly reasonable. Made deliberately lighter than in some institutions with idea that all members of staff shall do and supervise research. Latter regular part of work, but cannot be expressed in hours	Each instructor must give 2 majors each quarter. If laboratory work included, more hours spent in class room. Home Economics load same as in other departments except in those where laboratory work not included, load is 8 hours

RESEARCH IN PHYSIOLOGICAL AND FOOD CHEMISTRY IN THE HOME ECONOMICS LABORATORY

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University of California

The present organization of the Research Committee of the American Home Economics Association should make possible by sub-division a more efficient stimulation of research activity among home economics workers. This division into sub-committees based upon the major phases of home economics, institutional and household management, textiles, education, foods and nutrition, and extension, has already been explained to readers of the Journal. It is the object of this paper to present a further report upon the organization of the committee on research in foods and nutrition together with suggestions as to the problems and methods of investigation in this field.

In order further to simplify the matter of compilation of such suggestions, the sub-committee on research in foods and nutrition has been again subdivided into three smaller groups, dealing respectively with, 1) physiological and food chemistry, 2) field and clinic nutrition investigations, 3) methods of food preparation. Each of these groups will undertake to put together a suggestive list of questions in their own field which need investigation, and which have peculiar interest and appropriateness for the home economics department. They will in addition point out the work on these problems already published, and such unpublished work as they may be able to gain access to, and will suggest standards for accuracy and self-criticism in those undertaking research projects. This attempt is being made in a humble but determined spirit, and in the hope that the derogatory attitude of neglect or criticism now perceptible in outside observers toward research in the home economics departments of our colleges and universities may be met and destroyed.

THE FIELD OF PHYSIOLOGICAL AND FOOD CHEMISTRY

A difficult question at once arises when the vast and important field of physiological and food chemistry is surveyed by the home economics specialist. So varied and so fundamental to human survival is this field that it has been explored in all directions since the earliest beginnings of the scientific attack upon the problems of human environment. That much remains to be found out will be disputed by no one, but the right of the home economics laboratory to take over as its own any par-

ticular phase will undoubtedly be hotly contested. It appears to the writer of this report, however, that seeking the answers to constantly recurring practical questions upon digestion, food need, and food composition is quite as much our duty as is the corresponding search for answers to questions upon food preparation. However much the medical departments may be doing in this field it is plain that a vast number of problems remain unsolved and that many of these problems are of such a character as to commend themselves particularly to home economics workers. It cannot be doubted moreover from the cordial reception already accorded the few contributions made in this field that anything offered from the home economics laboratory will be welcomed by scientists working along similar lines in schools of medicine and public health, and in biological and medical research institutions.

The peculiar opportunities and privileges, as well as background and technique of the home economics staff should, however, never be forgotten in the choice of the problem. The large number of intelligent and eager young women students available as participating subjects should make metabolism studies upon women a marked subject for research. Little is on record as to the relation of the metabolism and food need of women to the menstrual and reproductive cycles, and yet no question more significant to the good of the race can be asked. It is surely not too much to expect that some light on this dark spot should be looked for from departments made up wholly of scientifically trained and interested women. Indeed, a beginning of this sort has already been made in more than one institution.

Another phase of the study of nutrition which has peculiar interest for women is that of infant and child feeding. It is significant that some of the earliest work done by research workers in home economics had to do with this topic. The development of the social phase of this subject in the present widespread clinic and field work with malnourished children is a natural outgrowth of such interest.

The enormous task of a complete biological analysis of all foods both raw and cooked in every manner remains to be carried out. The proximate chemical analysis of food so well begun some forty years ago has placed in our hands a valuable body of information concerning certain gross phases of food composition. This information needs to be added to in kind, particularly with reference to the composition of foods cooked according to specified methods, and this work should surely be done in the home economics laboratory. But the more laborious and perhaps

more significant testing by the biological method of these same foods has only been begun. The determination of the chemical and biological values of protein foods may and should be carried out side by side, and the same checking in the case of at least some of the so-called mineral elements is beginning to be worked out, particularly with reference to calcium and phosphorus. In the case of the vitamins only the biological method of analysis of foods is as yet available. The time should not be far distant when our tables of chemical composition and of vague qualitative vitamin content of foods will be supplemented by full quantitative information as to the values of these foods in animal nutrition.

Everyone is familiar with the frequent queries as to effect upon digestive processes of foods taken in certain combinations or cooked in given ways. These questions can be answered only by the tedious process of digestibility experiments, by the Rehfuss stomach tube, animal dissection, and similar methods. These problems might well be attacked in those home economics laboratories equipped with apparatus and personnel ready to handle them.

The foregoing survey is not meant to cover all possible phases of physiological and food chemistry which are suitable for development in the home economics department but is offered as suggestive of the broad outlines of such problems. The following specific topics are listed in the hope that they may prove of value to those who are ready to undertake new investigations.

PROBLEMS SUITABLE FOR RESEARCH BY HOME ECONOMICS WORKERS IN PHYSIOLOGICAL AND FOOD CHEMISTRY

1. *Variations in basal metabolism of women and children.* Determination of basal metabolism of underweight and overweight persons, of the influence of the menstrual cycle, of pregnancy and lactation, of overfeeding and underfeeding, of fevers, rickets, scurvy, anemia, diabetes, nephritis, goiter, digestive disturbances, and similar common pathological conditions.

Specialized but rather simple gaseous exchange apparatus is necessary for this work, and a special technique must be acquired for it.

The only institution so far reporting work on basal metabolism carried out in the home economics laboratory is the University of Chicago. The publications listed are as follows:

1. K. Blunt and M. Dye. Basal Metabolism of Normal Women. J. Biol. Chem., *47*, 69 (1921).

2. K. Blunt, A. Nelson, and H. C. Oleson. Basal Metabolism of Underweight Children. J. Biol. Chem., *49*, 247.

3. K. Blunt and V. Bauer. Basal Metabolism and Food Consumption of Underweight College Women. J. Home Econ., *14*, 117 (1922).

2. *Changes in composition of the blood*, with reference to such constituents as hemoglobin, creatin, creatinin, uric acid, urea, lipins, phosphates, glucose, under each of the conditions listed above. Better and simpler technique for such analysis is rapidly becoming available as a result of the work of Folin, Denis, Stanley Benedict, Bloor, and others, and much needed information about the intermediary metabolism should be obtainable by its use. Both human and animal subjects may be used in such studies, and cooperation with university and other hospitals should be sought. A valuable phase of the latter endeavor is the possible interest and instruction of the dietitians and students planning to work in the hospital laboratory or diet kitchen. Just as it has come to be apparent that sound and scientific training of nutrition specialists can scarcely be available where the facilities of a good medical school are lacking, so research in certain phases of metabolism must be restricted to the same conditions. Example of publication:

C. C. Wang and M. Dentler. Creatin and Creatinin in the Blood. J. Biol. Chem. *45*, 237 (1920–21) (University of Chicago).

Two unpublished theses of a similar type are as follows:

M. Johnson. Arginin as Pre-cursor of Creatin-Creatinin of the Blood. M. A., University of California, 1920. Work in progress.

M. Eager. The Glucose Tolerance of Women as Affected by the Menstrual Cycle. University of California. Work in progress.

3. *Studies of the origin and precursors of metabolic end-products in the urine and feces*, particularly with reference to their bearing upon the diet. Examples of particular importance are the numerous studies of creatin and creatinin, uric acid, ammonia, urea, glucose, and acetone bodies, of the urine as influenced by reaction of diet, protein and carbohydrate proportions, kind of protein, sex, growth, etc.; studies of the occurrence of phenols in urine and feces as an index of intestinal putrefaction upon various diets; the interrelations of calcium and phosphate excretion and its bearing upon bone and tooth development particularly in childhood, pregnancy, and lactation; effect of vitamin deficiencies upon the nitrogen and sulfur partitions in the urine; changes in urinary end-products in the various nutritional disorders.

Not many studies along these lines have as yet been reported from home economics laboratories, although their direct bearing upon every day questions of diet can hardly be doubted. Some of the titles already available are:

1. M. S. Rose. Creatinuria in Women. J. Biol. Chem., *32*, 1 (1917) (Teacher's College, Columbia University).
2. H. C. Sherman, H. M. Pope and L. H. Gillett. The Monthly Metabolism of N, Ca, and P in Healthy Women. J. Biol. Chem., *34*, 373 (1918) (Columbia University).

4. *Determination of the gross digestibility and rate of digestion of foods.* A great deal of the most needed data as to total per cent of foods digested has already been accumulated, but much remains to be answered as to the effect of various methods of preparation upon digestibility, and as to the more difficult problems of speed, completeness, and ease of digestion of foods taken in various combinations. The work of the United States Department of Agriculture may be pointed to as the classic on total digestibility, particularly the recent extremely interesting work on raw starch. The work of Hawk and co-workers at the University of Pennsylvania outlines another type of contribution, and that of Cannon and of Carlson are too familiar to need mention. This kind of experiment requires rather simple equipment and technique and should commend itself to the home economics staff newly beginning research. Some of the contributions from home economics laboratories already available are:

1. N. E. Goldthwaite. Effect of Carbohydrate on Casein Digestion. J. Biol. Chem., *7*, *69* (1909–10) (University of Illinois).
2. K. Blunt and M. Mallon. Digestibility of Bacon. J. Biol. Chem. *38*, 43 (1919) (University of Chicago).
3. M. S. Rose. Utilization of Salep Mannan. J. Biol. Chem., *42*, 159 (1920) (Teacher's College, Columbia Univ.).
4. A. L. Daniels and L. Strickler. Digestibility of Starch in Typical Dough and Batter Mixtures. J. Home Econ., *9*, 109 (1917) (University of Wisconsin).
5. M. S. Rose. Digestibility of Rolled Oats Prepared in Various Ways. J. Home Econ., *14*, 9 (1922) (Teacher's College, Columbia University).
6. M. S. Rose and G. MacLeod. Human Digestion Experiments with Raw White of Egg. J. Biol. Chem., *50*, 83 (1922).
7. A. F. Morgan and E. L. Brown. Value of Whalemeat as Human Food. J. Home Econ., *14*, 267 (1922) (University of California).

5. *The chemical analysis of foods.* Besides the usual routine chemical analysis of foods, information is needed as to distribution of the nitrogen, type of carbohydrate, composition of ash and make-up of ether-soluble extract. No particularly specialized equipment, other than the polarim-

eter and refractometer and ordinary chemical apparatus are needed for this type of work. Examples of publications from home economics laboratories in this field are:

1. K. Blunt and C. C. Wang. Chinese Preserved Eggs. J. Biol. Chem., *28*, 125 (1916) (University of Chicago).

2. M. Eichelberger and M. Asbury. Iron Analysis of Kale and Turnip. J. Home Econ., *14*, 131 (1922) (University of Chicago).

3. R. Okey and A. W. Williams. Inulin in the Globe Artichoke. J. Am. Chem. Soc. *42*, 1693 (1920) (University of California).

6. *The biological analysis of foods.* It is in this field probably that the largest amount of work remains to be done, and at the same time that the best beginnings appear to have been made. The technique of such analysis has been laboriously evolved through the last 15 years by such investigators as Osborne and Mendel, McCollum, Steenbock, Drummond, Hopkins, Funk, Chick, Sherman, and others, and is now well on the way to as nearly rational standardization as the chemical methods have attained. Although most of the work in this field has had to do with vitamins or proteins the method is by no means limited to these two problems. Animals are used as subjects in most of this work, although utilization tests on human subjects are common, and are to be included under this heading.

The space and equipment for animal feeding experiments are not available in all home economics laboratories, but it would seem advisable to provide them wherever possible, for pedagogic if for no other reasons. The teaching of the doctrine of vitamins, for example, becomes uninspired and unconvincing if practical contact with the method of their detection be not provided the students. The equipment of cages etc. is not expensive, but a special room or rooms is necessary for the proper housing of the animals.

A full description of standard methods for vitamin investigation is presented elsewhere by this committee,[1] so that further detail need not be given here. It should be noted, however, that aside from the detection of the vitamins in raw foods the home economics worker must be particularly concerned with the effect of cooking and preserving processes upon those vitamins.

Our knowledge of the value of isolated proteins or of total nitrogen of various foods for maintenance of adults or growth of young in animal

[1] Methods of Vitamin Investigation. Elizabeth W. Miller, *Jour. Home Econ.*, 1922, 14: 364–368.

and human subjects is far from complete. Likewise little is known of the utilization by man and animals of the various mineral elements in the forms found in foods. A few of the titles of articles reported from home economics laboratories will illustrate the width and variety of this field.

1. A. Richardson and H. Green. Nutrition Investigations upon Cottonseed Meal. J. Biol. Chem., *25*, 307 (1916); *30*, 243 (1917); *31*, 379 (1917) (University of Texas).

2. M. S. Rose and L. F. Cooper. Biological Efficiency of Potato Nitrogen. J. Biol. Chem., *30*, 201 (1917) (Teacher's College, Columbia University).

3. A. L. Daniels and N. B. Nichols. Nutritive Value of the Soy Bean. J. Biol. Chem., *32* 91 (1917) (University of Wisconsin).

4. A. L. Daniels and R. Loughlin. Feeding Experiments with Peanuts. J. Biol. Chem. *33*, 295 (1918) (University of Wisconsin).

5. A. L. Daniels and N. I. McClurg. Influence of High Temperatures and Dilute Alkalis upon the Anti-neuritic Properties of Foods. J. Biol. Chem. *37*, 201 (1919) (University of Wisconsin).

6. A. L. Daniels and J. Rich. Value of Inorganic Sulfates in Nutrition. J. Biol. Chem. *36*, 27 (1918) (University of Wisconsin).

7. A. F. Morgan and A. M. Heinz. Biological Value of Wheat and Almond Nitrogen. J. Biol. Chem., *37*, 215 (1919) (University of California).

8. M. S. Rose. Utilization of Calcium of Carrots by Man. J. Biol. Chem., *40*, 349 (1919) (Teacher's College, Columbia University).

9. A. L. Daniels and R. Loughlin. Fat Soluble Growth-promoting Substance in Lard and Cotton-seed Oil. J. Biol. Chem., *42*, 359 (1920) (University of Wisconsin).

10. B. K. Whipple. Water-soluble B in Cabbage and Onion. J. Biol. Chem., *44*, 175 (1920) (University of Chicago).

11. M. Davis. Observations on Vitamin Content of Foods. J. Home Econ., *12*, 209 (1920) (University of Wisconsin).

12. M. Davis and J. Outhouse. Effect of Ration Low in Fat-Soluble A upon the Tissues of the Rat. Am. J. Dis. Child., *21*, 307 (1921) (University of Wisconsin).

The following titles of work now in progress or unpublished are reported from a number of institutions:

1. L. Stanley and B. K. Whipple. The Influence of Cooking and Canning on the Vitamin Content of Foods. (University of Missouri.)

2. Almonds and other Nuts as Source of Vitamin A. Utilization of Calcium of Almonds. Utilization of Calcium in Man. Basal Metabolism of the White Rat. (Teacher's College, Columbia University.)

3. B. M. Newbecker. The Biological Value of Almond Proteins and Almond Oil. M. A., 1922, (University of California).

4. L. D. Francis. The Effect of Dehydration upon Vitamin-B Content of Pumpkin. M. A., 1922 (University of California).

7. *Studies on infant and child feeding.* This division of the field is logically only a part of that dealing with the biological analysis of foods, but is of sufficient interest in itself to command special attention. Most of the work in this line done by home economics specialists has now be-

come social in character, and has taken on the form of the well-known "nutrition" class or clinic. As examples of the scientific type of research which may be carried on, however, the following titles are given:

1. R. Wheeler and A. Biester. Nutritive Value of Some Proprietary Infant Foods. Am. J. Dis. Child, *7*, 169 (1914) (University of Illinois).
2. R. Wheeler. Nutritive Value of Some Proprietary Infant Foods as Milk Modifiers. Am. J. Dis. Child., *9*, 300 (1915) (University of Illinois).
3. A. L. Daniels, S. Stuessy and E. Francis. Nutritive Value of Boiled Milk. Am. J. Dis. Child, *11*, 45 (1916) (University of Wisconsin).
4. A. L. Daniels and H. English. Simple Method of Modifying Milk, Am. J. Dis. Child, *17*, 212 (1919).

No claim is made that all work of this kind reported from home economics laboratories is listed in the preceding discussion. It is likely, however, that the omissions have not been numerous. A considerable volume of investigation in this field has been carried out by women primarily interested in home economics but working in other departments or under men of high rank in medical and chemical laboratories. This valuable body of research is not here credited to home economics, but only those pieces of work are so credited which were conceived and carried out by home economics women working in their own laboratories. The list is not a negligible one, either in size or in variety or in value, but the committee feels convinced that it is too short, and that it could well be lengthened by home economics departments as now organized by the exercise of courage and careful planning.

TEAMWORK IN THE FAMILY

REBECCA J. GRADWOHL

"If I left, your mother would cry her eyes out," declared Mary Jane, the maid, to Phyllis, her confidant in all affairs domestic. This was but the beginning of Mary Jane's discontent which increased until she was finally given notice, and mother decided that for a time at least there should be no more Mary Janes. She called to her aid Phyllis, aged nine, her sister Aline three years older, and father. A session was held, and the result was a unaminmous decision to join forces with specialized help in running the machinery of the home themselves. In other words, they determined that as they were all able-bodied and will-

ing, they would do what they could by teamwork, and leave the rest to specialists called in by the day or hour.

It was winter when the plan was started. The house having no furnace, was heated downstairs by open fires, and upstairs by a coal oil stove. Father's duty was to bring up coal from the basement each morning, and to keep the oil stove filled. Phyllis made her bed and dusted the upstairs sitting room. As Aline devoted one hour each morning to her music, she could rarely do more before school. The breakfast was prepared by mother. When the children had gone to school, she washed the dishes, tidied the kitchen, prepared the vegetables, and often made a pie or cake for the evening meal. Then she dusted living and dining rooms. The upstairs work, including the mopping up of the bathroom, occupied an hour more, and by ten o'clock she was ready for market. Food was bought for several days, thus eliminating the necessity of daily marketing. Twice a week, the children took their lunches to school, leaving mother free to lunch downtown, do her shopping, or pay a social call until half past two o'clock. On the days the children came home, she rested after lunch, then sewed and read, and occasionally invited friends to come in for an informal visit. The evening meal did not, as a rule, require more than an hour in the kitchen. The little girls set and cleared the table, and together they washed and dried the dishes.

The remainder of the housework was done by specialists. The washing was sent to the laundry. Once a week a Japanese boy vacuumed the rugs, polished the floors, scrubbed the kitchen, and thoroughly cleaned the pantry.

Of course, mother was not so free to come and go as she had been with a maid but she had more time to read, to take up French and to become acquainted with her neighbors. These neighbors were pleasant and helpful. Like herself, several of them were managing their homes without maids. They suggested that, if they were at home any afternoon, the children come to them after school; then mother need not hurry home. The offer was eagerly accepted and reciprocated to the advantage of the neighbors.

Another delightful and old-fashioned phase of life sprang from the family's solution of the help question. Mother found that a number of her friends, experimenting in running their households without maids, had no kindly disposed neighbors; so she proposed that when a friend came for the afternoon the children accompany her. The proposition

was accepted, and the children played happily outdoors or upstairs, while their mothers chatted and sewed.

Advantages accrued to Phyllis and Aline from this solution of the help problem. The sense of responsibility strengthened their character; the duties were lessons in household training; the experience supplemented theory. Aline, whose school curriculum included cooking, was given the opportunity to test her knowledge at home. Mary Jane had allowed no school girl to experiment in her kitchen, but mother not only permitted but encouraged her.

This teamwork proved economical too. The extra laundry bills and the sum paid specialists about equaled the maid's wages, but the cost of her board was eliminated, as well as much waste and extravagance. Consequently, mother had quite a reserve sum in her purse at the end of the month.

Aline and Phyllis were remunerated for their work. Mother gave each child twenty-five cents a week for services in general. Father paid for specific duties fulfilled. The making of a bed each morning was six cents a day; the dusting of a room, three cents; washing the bathtub, two cents; sweeping the front steps and sidewalk, three cents. An account of these daily earnings was entered in a little book, and each week it was presented to father who audited it, and paid them in a business-like manner.

To mother the sweetest part of this coöperation on the children's part was the willingness, independent of reward, with which they helped carry out her plan. To them it was a game to be played, and they played it happily and freely with mother and father as participants. Possibly their method would not have succeeded had the children been too young, for mother could not have carried out her plan without their aid. But under the conditions described it proved a success. It incurred no hardship, no undue burden; rather it resulted in much happiness, much genuine comfort, and a return to those old-fashioned virtues that blossom best in a soil of mutual helpfulness and thoughtfulness.

EARLY ENGLISH CUSTOMS

ELEANOR F. WELLS

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Once upon a time, when the world was young, and the battle of Hastings was perhaps in the making, Old England's homefires burned none the less brightly than today. But the fireplace was different. Let us peek for a bit into an old Saxon manor, a village in itself. Here, around a courtyard, clustered spinning house, bake house, and brew house; farm buildings reared their thatched roofs skywards; oxstalls, pigsties, and slaughterhouses hobnobbed with sheep and dovecots; a tiny chapel nestled in its niche. One postern gate, jealously guarded, gained admission to the whole. Did not De Bois Guilbert and the jolly Prior of Jorvaulx sound their horns full loudly at the gate, before entrance was granted them to Cedric's Hall? Nor was it any easier to venture outside that barred door, when once within. Only a bribe to the swineherd, be it remembered, could lift that magic lock to the disguised Ivanhoe, on his early morning departure.

Such an estate is the Baronial Hall of Penshurst, in Kent. This structure shows the original architecture unsullied by our modern touch. The hall is large and spacious. The lofty arches of panelled oak give it great height. The floor is brick; probably in early periods it was strewn with rushes. In the center of the floor is an octagon shaped space, about one and one-half yards wide, marked out with a rim of stone; inside is a massive old fire dog. Smoke from the fire ascended through a hole in the roof. From one end of the hall, large Gothic windows look down on the room; two long tables of split oak border either side of the hall. Here on rough benches, the family retinue, and lesser guests munched their brawn and drank their ale. My lord and lady of the manor dined on a raised platform or dais, at one end of the room. At the other, a tall wainscoat "screen" supports a music gallery. The space beyond is a concealed passage where basins of water were provided for the underlings to wash their hands. The guests were served fingerbowls.

The Saxon kitchen was a large room, sometimes thirty feet square, with an open drain running through its center. As many as three fire places were often in use at once. The smoke from the blaze escaped through the center of the roof. Before these fires the poor kitchen

scullions crouched upon their haunches, and turned the spit. Old pictures show a long rod, horizontal with, and a few feet from, the floor, propped up by rests. At either end was an unfortunate youth, turning the heavy iron which held speared a string of fowl for the coming meal. Charcoal fires gleamed red under the sizzling meat. Wood was gathered from the nearby forest, and thorns for crackling under the pots. Coal was a thing unknown. Huge cauldrons of iron and copper reflected the glow of the ruddy blaze.

Dinner, the formal meal of the day, was served about ten in the morning. Tables, like long trestle boards, were placed down the center of the room. Handwoven linen tablecloths covered their rough ugliness. The diners filed to their places "in the order of their going." First came the master of the house and his guests. His secretary pompously led the retinue of chancellors, marshalls, steward, master of the horse, chaplain, and choristers chanting grace. Then followed the constable, pages, trumpeters, and finally the jester. When all the guests and retainers were assembled, the master steward knocked loudly on the table, and the blessing was chanted. The alms dish was then brought forward. "To serve God first" was the motto, and no food was touched until a loaf of bread was placed in the alms dish. This was in constant circulation for further contributions, during the meal, for the benefit of the deserving poor at the gate.

The salt cellar, sometimes of gold and fashioned in strange devices, played an important part in the seating of the guests. It was placed midway the table, as a boundary of distinction. All seated between it and the head of the table were marked guests; those of inferior rank sat below. The modern superstition about salt dates from this period. It was the custom to throw a pinch over the left shoulder, or to help oneself, muttering a blessing, and it augured ill to spill any, or to help another.

Ladies and gentlemen sat side by side at table, so that they might share the same plate. An old book of "Courtasye" warns one, "If you eat with another, turn the nicest pieces to him, and do not go picking out the finest and largest for yourself."

With all the guests seated at the table, a blare of trumpets announced the dinner. A train of servants entered, bearing pewter platters with huge joints of meat, and fowl and game were carried in on spits. Each guest helped himself by tearing off his meat with his hands. Small wonder there was need of fingerbowls! Each person brought his own

knife and a whetstone hung near each chair, lest the steel prove too dull. The pastries and loaves of bread were not forgotten. Wine, ale, and beer were served in silver cups to those above the salt cellar; those below, quaffed their thirst in pewter or in horn. Three hours or more were given over to the feast while jesters, tumblers, jugglers, and minstrels amused the guests.

Not so much ceremony was manifest among the lesser nobles. But we know that the country franklin was "Epicurus' own son."

> Withouten bake mete never was his hous,
> Of fish and flesh and that so plenteous
> It snewed in this hous of mete and drink
> Of alle dainties that men coud of thinke.
> Woe was his cook but if his sauce were
> Poinant and sharpe, and redy all his gear.[1]

The absence of vegetables is noticeable in the dietary. Potatoes were at that time unknown. Cabbages were imported for the next three hundred years. Considering the amount and kind of food served, it is small wonder few lived to reach old age. The poorer folk were better off. Albeit their food was limited. the black bread, peas, and bacon proved a more balanced ration than that of their aristocratic neighbors. Contrast this living with that of their feudal lords, who breakfasted at seven on white bread, beef, and wine, dined at ten, supped at four, and between eight and nine partook of a "reve-supper," an evening collation of bread, ale, and spiced wine.

The housewife of the period was in full charge of her household. An extract from the diary of Elizabeth Woodville, queen to Edward IV reads:

> 6.00 A.M. Breakfast. Buttock of beef rather too much boiled, and the ale a little the stalest. Memo. to tell cook about the first fault, and to mend the second myself, by tapping a fresh barrel directly.
>
> 10.00 A.M. Went to dinner.
>
> 7.00 P.M. Supper at table. The goose pie too much baked, and the loin of pork almost roasted to rags.

Gifts of eatables were common forms of courtesy. One donation given by the Mayor of Coventry to Margaret of Anjou on her sojourn through that city is listed as "three hundred loaves of fine bread, a pipe of red wine, a dozen capons, a dozen grete fate pykes." Such a donation

[1] Chaucer: Canterbury Tales.

would be rather appalling in this day, even with our modern cold storage facilities. But travelling, at that period, included a large retinue; inns were few and far between, and the food served there questionable; therefore the cook with his pots and pans, was an important item in the "companie."

William the Conqueror brought a full kitchen force with him to England. A glance at one of his menus makes one feel that his warriors won their battle on the field of Hastings with the meal in prospect, for, having once consumed it, there could have been little incentive for aught else. An example of one of his meals runs:

First course: Boar's head with its tusks in its snout, garnished with flowers.

Second course: Venison, cranes, peacocks, swans, wild geese, kids, pigs, and hens.

Third course: Spiced and seasoned meat, with wine, red and white.

Fourth course: Pheasants, woodcocks, partridges, larks, plovers.

Fifth course: Sweetbreads, white powder (sugar?).

The peacock was a favorite dish, and was often skinned, cooked, and then put back in its glowing vestments again. Birds were served in their "coffyns." Here we get the evolution of our modern pie. After a joust-at-arms a banquet was often served. Among other foods, a peacock, still in its plumage, was placed in a "coffyn of paste," the neck erect, tail expanded about the crust, and comb richly gilded. Carried into the hall on a silver dish, heralded by a blast of trumpets, it was placed before some knight, victorious in the day's tourney. "Rising, it was the custom to break the crust, vowing at the same time to rescue some captive lady from some mythical monster, or die though his vow, like the pie crust, was made to be broken."

Books of etiquette of the period indicated close attention to manners, although in reading them one feels the rules should pertain more to children than to adults. One reads "Set never on fish, flesh, nor fowl, more than two fingers and a thumb. Look they nails be clean lest they fellows loathe thee." A conservative statement admonishes one "if thou spit on the table thou shalt be considered discourteous." The aspirant for food should "nurture it," and not cram his cheeks like an ape, nor yet must he blow upon it. There were requests not to turn back to your plate the food you have just put in your mouth, nor to offer another person the remains of your pottage. Not to eat too much cheese, nor to take more than two or three nuts when placed before you, were more

esthetic mandates. We find suggestions, that the mouth be wiped before drinking, lest grease go into the wine, "which is unpleasing to those who drink from the same cup."

The nun in Canterbury Tales seems to be perfection in all that should be:

> She let no morsel from hir lippes falle
> Ne wette hir fingers in hir sauce depe.
> Wel koude she carie a morsel and wel kepe,
> That no drope ne felle upon hir breste.
> Hir over lippe wyped she so clene
> That on hir coppe ther was no ferthy sene.

Recipes have come down to us from such interesting books as the "Form of Cury," a cook book compiled by the master cooks of Richard II. One curious combination is a dish called "Cockyntrice." The cook is directed to take a capon, scald it, clean it, and "smyte it in two at the waist," and do the same to a pig; then sew the forepart of the capon to the hind part of the pig, and the forepart of the pig to the hind part of the capon, and stuff them. For stuffing, one may "pound an ounce of pepper, honey, and wine. Make it hot. Break a dry biscuit into bits and mix. Stir with a twig of green laurel, and boil until all is thickened."

"Montreuse" was a favorite dish eaten with a spoon. The Canterbury Pilgrims were not without their knowledge of it. Their "coke," be it remembered, could "maken montreuse and wel bake a pie." The recipe reads, "Take hens and pork and boil them together. Take the flesh of the hens and of the pork, and hew it small, and grind it all to dust. Take grated bread, and put thereto, and temper it with broth, and mix it with the yolk of eggs, and cast thereon strong powder (a mixture of strong spices). Boil it, and put therein powder of ginger, sugar, saffron, and sale. Then look that it be stiff, and flour it with ginger powder." However stiff it may have been, I think we may feel assured of its hotness. This excess of spices must have rather overpowered the flavor of the meat. And in this, there may have been good reason, for early records show that butchers were punished for selling bad meat. At the best, their supply could not have been so good as ours, as there was no means of preserving it, except by salting it down.

There were innumerable "potages and bruets" (soups and broths) with vegetables such as leeks, onions, cabbages, peas, turnips, and parsnips. One dish known as "Joutex" consisted of violets, mallow, parsley,

young cabbage, beet, tongue, and two or three marrow bones, boiled in fresh broth and seasoned with saffron and salt. It was served with bacon.

Some of their sweets were very similar to ours. We read of cheese cakes, pancakes, and fritters. Some were made only of sugar, butter, and flour. Others boasted apples and ale, or figs in addition. A recipe for "Mylk Rosted" tells us to "Swynge (beat) eggs and sweet milk togeder, put thereto saffron, and boil it till it be thick." This suggests custard.

The use of saffron was very extensive. With cochineal, it was introduced into sugar and pastry-devices known as "subtleties." They were used for table decoration in place of flowers. One description tells of a stag made of paste and filled with claret. An arrow is removed from the stag and life blood, in the shape of claret oozes out. Large pastries were placed on either side of the stag, which on being cut, let loose live frogs and birds—verily a "pretty dish to set before the king."

Thus as we look through the dim ages of the past, we behold strange customs, foods, and ways of living. Courser and rougher, perhaps we find the people, than those that we know today, who have felt with the passing generations the softening influence of easy living conditions. We have outgrown many of the harsher traits, although we still have some buffoonery left. The necessity for the "Book of Courtesaye" we hope is passing out of existence. The better qualities of our ancestors, their courage, enterprise, and hospitality, may we always keep, and as we pass on, what may our descendants write of us? Who knows?

EDITORIAL

The Convention in the West. For two years home economics women have looked forward with keen interest to the convention to be held at Corvallis. Now that it has actually come to pass, we know that no anticipation was beyond the mark, no picture too rosy. The West has won us all—that great, beautiful country whose people measure their hospitality to match their mountains.

A feeling of power was in the group of seven hundred women who gathered at the Oregon Agricultural College. With a membership of over three thousand, with twenty-five states already affiliated and twenty more ready to affiliate during the fall, they saw the vision of the possibilities for service of such an organization. The recognition by the Board of Education of Portland, the Chambers of Commerce of Portland and Corvallis, the Progressive Business Men's League, the University of Oregon, and the Oregon Agricultural College was encouraging and gratifying.

An appreciation of the larger relationships of the Association and of every member was the keynote of the meeting. Our contribution to the health movement, to legislation, to all phases of child welfare, to problems of the home and the community were so emphasized as to challenge home economics women in whatever field they may serve. The excellent program, strong, well-balanced, and coherent, demonstrated the sound development of every section and of the Association as a whole.

The convention was a time of stimulating companionship and inspiration to the hundreds of young women who attended this as their first annual meeting. It meant renewed enthusiasm and confidence to all who have faithfully built the Association through the years. It will ever remain a gracious memory and a thrilling promise.

An Appreciation. Many persons contributed to the unusual success of the convention. The JOURNAL, as the voice of the Association, expresses sincere appreciation to all of these and especially to the following: Miss Nina Streeter, whose tireless efforts in arranging for the "Special" afforded a delightful trip across the country to the groups starting at Chicago and St. Paul; Miss Helen Davis and her committee who prepared the excellent program; Miss Bernice Waite who organized the interesting exhibits; Miss Zelta Feike whose capable management of the publicity resulted in widespread and satisfactory comments on

all addresses; to Dean Milam, her devoted staff and students, whose organization and arrangements were perfectly carried out in every detail.

Place of Meeting. The Association at the recent annual meeting accepted the invitation of the University of Chicago to hold the next annual meeting in Chicago during the early part of August, and the invitation of the National Society for Vocational Education to hold a joint meeting in Detroit November 30 and December 1 and 2. This arrangement for the midwinter meeting inaugurates a new policy of meeting from year to year with societies of related interests rather than with the Division of Superintendence of the N. E. A. The perfection of arrangements for the Corvallis meeting made very apparent to the Association the importance of making arrangements for meetings well in advance. The Committee on Time and Place for the two meetings subsequent to the Chicago meeting has therefore been asked to report at Detroit. Invitations should be in the hands of the Chairman, Miss Cleora Helbing, Louisiana State University, Baton Rouge, Louisiana, in time for action in Detroit.

The Diet of the Nursing Mother. The general prescription of a diet, during lactation, consisting of plenty of good, wholesome, easily digested food exemplifies the vagueness of our knowledge concerning the actual food needs for ideal milk production. It is known that diet has much to do with quantity of the yield and that quality is affected by the food of the mother, noticeably so in such marked cases of poor nutrition as beri-beri, pellagra and the semi-starvation of war-ridden Europe. McCollum[1] cites many instances of this kind. What a man inherits in the way of physical vigor is accepted quite generally to be largely dependent upon his food during the early months of life and even upon the state of nutrition of the mother during his foetal life. Hence we eagerly await a better understanding of the nursing mother's food requirements.

The old saying that "milk makes milk" is not true in the literal sense but the quality of the food does determine the constitution of the milk. Meigs[2] in summarizing the studies of the effect of changes in rations upon the milk yield of animals, makes it clear that protein plays a dominant part in the regulation of milk secretion. Greater differences

[1] McCollum, E. V., The newer knowledge of nutrition, 1922.

[2] Meigs, E. B., Milk secretion as related to diet, Physiol. Rev. 2, 204 (April, 1922).

can be made in the volume of milk by changing the protein intake to another level than by changing either the fat or the carbohydrate to a comparable degree. When the protein of the food is increased, the per cent of protein in the milk is not noticeably increased but the volume of milk is so enlarged that there is a decided increment in the total protein and other nutrients secreted for the day. This summary also states that changes in the amount of carbohydrate fed have no immediate or significant effect upon either the total milk secretion or its composition. Changes in fat intake may alter the composition slightly though not the volume of milk.

All of which hints at the light which recent experiments are shedding upon the chemistry of milk elaboration. In his review of the literature Meigs evaluates the theories concerning the source of the constituents of milk. The mammary gland manufactures its lactose from the glucose it takes from the blood. The phosphatid carried to the gland by the blood is the precursor of milk fat. The proteins are built up from free amino acids.

Many difficulties attend a quantitative determination of the food needed for the support of milk production. The available data indicate, Meigs says, that in animals it requires two grams of protein to produce one gram of milk protein and two grams of total nutrients to produce one gram of total nutrients, in addition to the food for maintenance. Probably some such ratio exists in human feeding for milk production also. The quantity of protein to be allowed in the diet would be determined partly by the quality of the proteins fed, those of an amino acid content suitable for the synthesis of milk proteins being used most efficiently. Hartwell[3] reports that rats can suckle their young successfully on a low protein diet when the proteins are from a bread and milk combination. Hoobler[4] found that proteins of milk and meat were not any more adequate for milk production by women than the protein of nut mixtures. Others have demonstrated also the satisfactory nature of nut proteins.[5] A rather generous use of milk in the mother's food would furnish protein of a good quality to aid in forming milk proteins and to increase the volume of milk yielded; to this extent could it be said that milk makes milk.

SYBIL WOODRUFF.

[3] Hartwell, G. A., Effect of diet on mammary secretion, Biochem. Jour., 15, 140 (1921).

[4] Hoobler, B. R., The effects on human milk production of diets containing various forms and quantities of protein, Amer. Jour. Dis. Child, 14, 105 (1917).

[5] Editorial, Nuts for our proteins, Jour. Home Econ., 13, 232 (1921).

The Textile Collections in the United States National Museum. It may not be known to many readers of the JOURNAL that there have been developed, in the National Museum at Washington, collections of raw fibers, woven and knitted fabrics, and other articles bearing on the textile industry. Since this industry ranks first in the number of wage earners employed, and is only exceeded by food-stuffs and the iron and steel industry in the value of the products produced, the exhibits in the National Museum are arranged to show the American citizen what the textile industry means to him and to the United States.

The collections are arranged to show what raw materials are used and how these are worked up into yarn and cloth; the types of fabrics manufactured for special uses, how these are constructed and decorated, and to what use these fabrics are put. Through the coöperaion of a number of the best American manufacturers of textiles, new fabrics are shown to the public as soon as they are brought out and very often before they have become generally known.

The National Museum is a Government bureau under the administration of the Smithsonian Institution, and to it is assigned the care and preservation of all objects of scientific interest presented to our Government, or acquired as a result of the expenditure of Government funds, when such objects are not in actual use by some other bureau or governmental body. Although but one of the important functions of the Museum, this one, in which it serves as a place of deposit of valuable historical records in the form of actual specimens, is very generally overlooked. Some of the material thus acquired is of popular interest and is made use of in the installation of exhibits arranged and labelled to attract the attention of the average visitor. The greater part of the national collections, however, are not on exhibition in the general sense, but are kept in special rooms for the use of the technical and scientific student and investigator.

The textile collections are developed along this same general plan and have been arranged in an exhibition series and a technical or reference series. The part of the collections shown to the general public and exhibited in glass cases are arranged in the following seven main groups:

(1) The source, preparation, and manufacture of the most important spinning fibers: cotton, wool, silk, flax, hemp, and jute. (2) The manner of making yarn, thread, cloth, felt, and lace, shown by models, photographs, and some full-sized machines. (3) Woven structures, typical weaves, and standard fabrics, arranged according to construction

and use. (4) The ornamentation of textiles by dyeing, block and roller printing, stencilling, weaving, and embroidery. (5) The use of fibrous materials for hats, baskets, mats, brooms, and brushes. (6) Cordage fibers for all sorts of twine, cords, ropes, and examples of the uses to which they are put. (7) Important textile inventions, such as the first cotton spinning machine made in America; original model of Whitney cotton gin; the first sewing machine to sew a seam, etc.

The technical or reference series of the textile collections is the one most likely to be of interest to teachers of home economics. It chiefly comprises a comprehensive and constantly increasing collection of authentic examples of raw fibers and textile fabrics. Specimens in the exhibition series are replaced by new ones as often as necessary to keep the exhibits looking fresh and representative of patterns and designs on the market. The specimens so replaced are then put in the technical series and kept as a record of changes in the industry. These specimens also form the basis of a textile glossary, now in course of preparation, which will be based, as far as possible, upon actual specimens. Now that standard methods of examining and testing fabrics for count, weave, strength, and wear, are being adopted, it becomes all the more necessary that the fabrics themselves be standardized and known by distinctive names. The National Museum is endeavoring to collect and preserve examples of all types of fabrics put upon the market from time to time.

The National Museum wishes to be of srvice to teachers of home economics and invites all who visit Washington to examine the national collections. For those who cannot avail themselves of this pleasure, the curator and his assistants will be glad, as far as time and the equipment permit, to identify and compare with the textiles, in the Museum's collections, any samples submitted by teachers or other workers in home economics.

F. L. LEWTON,
Curator, Division of Textiles.

OPEN FORUM

The Service of the Library to the Home Economics Department. Books on home economics, in common with those of other subjects, do not include all the material needed in the class room and consequently supplementary material must be used. Pictures, lantern slides, educational exhibits, clippings, pamphlets, books, all these may be put to use

in widening and deepening the instruction in the home economics department and in creating a greater interest on the part of the students in preparing assigned topics.

Sources of pictures are duplicate copies and odd numbers of old magazines, picture sections of newspapers, sets sent out by manufacturing firms, pictures of the furnishings of different rooms in the house, pictures of costumes, particularly historical charts and bulletins.

Sometimes the history and geography departments have lantern slides to illustrate interior decoration, costume, and the cultivation and manufacture of commodities. Look over the catalogs of different firms dealing in lantern slides and you may find some that are exactly what you need.

Clippings from newspapers and magazines will increase the resources of the library especially on many small, relatively unimportant subjects or on new subjects about which there is little information. When more information is available these clippings may be thrown away. Pamphlets offer a mass of material singularly useful. They are issued by manufacturing firms, the federal and state governments, home economics departments, and agricultural experiment stations. Be on the watch for notices of valuable pamphlets. The monthly catalog of United States public documents and the monthly catalog of state publications, both obtainable from the Superintendent of Documents, Washington, D. C. are invaluable. The Booklist each month has a list of pamphlets, and the JOURNAL includes pamphlets in its bibliography.

Catalogs of firms dealing in refrigerators, heating apparatus, and other household equipment may be kept for the use of home economics classes. Certain magazines should be subscribed for regularly, and the back numbers kept on file. Many of the magazines, devoted almost exclusively to fashions, are quite expensive and of only temporary use. It is more satisfactory, especially with limited funds, to buy at local news stands only those numbers needed. Three or four different magazines thus obtained for fall, winter, and spring use would give a wider choice than if only one such magazine were subscribed for regularly.

Books must be bought for the home economics department. The several volumes of the United States Catalog will give the author, title, and publisher of books published some time ago; price is also given but this must be looked up in the Publishers Trade List Annual, latest edition, to get the corrected price. The Cumulative Book Index will help in selecting recent books. The Book Review Digest, with its

descriptive notes and abstracts of book reviews, which have been published in a selected list of magazines and book sections of newspapers, is an almost indispensable aid. Plus and minus signs are used to show whether a review is favorable or unfavorable.

After the books have been received, the librarian sees that they are adequately cataloged for circulation and are delivered to the teacher of home economics. Reserve shelves may be set apart in the library.

Pictures and clippings may be kept in a vertical file, classified by the decimal classification or arranged alphabetically by subject, using the subject headings of the Reader's Guide. Pamphlets may be kept in pamphlet covers and cataloged, provided they are likely to be in rather constant demand; those of less value may be kept in a pamphlet box with books on the same subject, and entered under the general subject only in the catalog; or they may be kept in a vertical file arranged like the pictures and clippings.

If the library is to be of the highest value to the students each one must know how to use it. Sometimes the English and history departments give half or whole recitation periods to the librarian for this instruction. Why should not the home economics department do this? The librarian, not the teacher, should give the instruction in the rules of the library, the location of books, the use of the catalog, and the finding of books on the shelves. Later on, the use of common reference books and of magazine indexes should be explained. By means of this instruction, the students can readily look up material for topics, not only in the high school library but also in the public library used to supplement the school library.

MARY JOSEPHINE BOOTH,
Librarian Eastern Illinois State Teachers College.

BOOKS AND LITERATURE

Foods of the Foreign Born in Relation to Health. By Bertha M. Wood. Boston: Whitcomb & Barrows, 1922, pp. 98. $1.25.

In her work as dietitian for the food clinic at Boston Dispensary, Miss Wood has an enviable opportunity for intimate study of the food habits of a large number of our foreign born peoples. The contrast made by the physically sound, well developed immigrants to the pale under nourished children found in these same groups, after a short time of residence in American cities, has struck every one who comes in close contact with them. Miss Wood says: "the Polish children and those of other Slavic peoples come from a sturdy race. Upon arrival in this Country they have round, well shaped heads, rosy cheeks, and strong bodies. With their kerchiefs over their heads they make a fascinating picture of health. They have an abundance of mild and fresh air in their own countries. Here they live at first in crowded districts and milk is counted as a drink, not something to eat; they eat what the grown ups have and they pay the price."

The poorer food doubtless accounts partly for these changes. Recognizing the difficulty encountered by people with limited experience, narrow knowledge of food materials, and small income in changing their food habits, Miss Wood presents material designed to help the nurse, teacher, dietitian, and social worker who are trying to help them make the adjustment. A brief account is given of the native foods and the manner of their preparation for the followings groups: Mexicans, Portugese, Italians, Hungarians, Poles and other Slavic peoples, Armenians, Syrians, Turks, and Greeks.

The book contains a number of recipes, for each nationality, in which American food materials are used. Many of the recipes are of elaborate dishes which would consume much time and better equipment than the households of most immigrants contain. The book would perhaps be more valuable if greater space were given to the simpler dishes. The latter are, however, not entirely neglected, and examples can be found for each nationality.

A special valuable feature of the book is the compilation of diets adapted to each nationality, and recipes for such diseases as diabetes, tuberculosis, and nephrites.

Throughout the book emphasis is laid on the desirable points in the diet of each group and use of them in constructing a new dietary which will be possible under the conditions the immigrant finds here. It is a valuable contribution to the scanty literature on the subject, greatly needed by those who are trying to help the foreign family make the necessary changes in their habits. Too frequently the worst of our American customs, instead of the better ones, are adopted.

Florence Nesbitt,
United Charities of Chicago.

The Vitamines. By Casimir Funk. Authorized Translation from the Second German Edition by Harry E. Dubin Baltimore: Williams & Wilkins Co., pp. 502, 1922. $5.50.

The development of our knowledge of the deficiency diseases and the relation of the vitamins to them has been one of the striking features in the development of the science of nutrition in the past decade. Less than ten years ago in October, 1913, Dr. Funk made one of the pioneer attempts to collect the facts, weld them into theories and to suggest new lines of research in the field of vitamins, and the first edition of the present work resulted. Since that time, vitamin studies have multiplied, as is attested by the extensive bibliography of more than sixteen hundred titles in the present edition.

Two other monographs on vitamins have appeared in this country recently, but the present volume is more extended in scope than either of the others. On the other hand, it reflects more closely the views of one man on the subject although the citations from the literature are extensive. As Dr. Funk himself admits in his preface, he

feels "justified now in reviewing only those investigations the viewpoint of which is not too far removed from ours." Dr. Funk is a vitamin enthusiast and in his desire to include all vitamin material, has discussed certain diseases, the relation of vitamins to which is problematical at present. Especially is this true of those included in the last two chapters, as, for example, pneumonia, anemia, exophthalmic goitre, and diabetes. Particularly interesting to the reviewer is the discussion of that peculiar disease of the South African cattle, lamzietke, pica, or, as recently discussed by Dr. Green, osteophagia. The inclusion of many of these diseases of doubtful etiology has added greatly to the value of the book.

Throughout, Dr. Funk has preferred to retain the name "vitamines" originally suggested by him in 1912. He points out that the fact that it has become popular, despite efforts to supplant it, proves its desirability, as "a badly chosen catch word like a folk song without feeling can never become popular."

The subject matter is divided into three parts: "the vitamine requirements of plants and animals; chemistry, physiology, and pharmacology of the vitamines; and the human avitaminoses—conditions in which the vitamines play a role." In the first part, a clearer differentiation of the quantitative variations in the vitamin requirements of different species would be desirable. This variation as pointed out recently by Mitchell in *Science* has led to no little confusion.

Throughout, the translator, who is fortunate in his personal association with Dr. Funk in his researches, has caught the spirit of the author. The book well deserves a place on the shelves of all nutrition libraries.

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NEWS FROM THE FIELD

COLORADO

Colorado Agricultural College. Two important conferences were held at the College during the Summer Session. At a five day conference of teachers of vocational home economics, field problems were discussed and plans made for a state survey and the development of a state course of study. During two weeks, beginning July 17, the Southwest Division of the American Red Cross and the Colorado Agricultural College conducted a joint Institute for Public Health Nurses, the Department of Home Economics serving as the main college representative. The states in the southwest were well represented.

The Health School, in which were enrolled girls and boys between the ages of nine and twelve, was a feature of the summer session. It served to stimulate interest in health habits in the children enrolled, and aroused a like interest in members of the dietetics class who assisted in the preparation of the Health School lunch. In previous years the department has conducted similar classes.

NEW MEXICO

Summer Work. Instruction in vocational home economics at Alamogordo does not cease with the closing of the high school in May, as Ruth Ann Morgan, who has charge of the work, is employed on a twelve months basis. Through home project work and home visits during the summer, home economics has become a community influence.

Following are some typical projects: Family laundry for a family of five; cleaning and renovating of hat; preparation and serving of dinners for a family of five; daily and weekly care of bedroom and clothes closet; garment construction, 1 dress, 2 petticoats, remodeling of 1 dress; cleaning, pressing, and storing of winter clothing; care of three year old child for one week; planting and caring for small vegetable garden for 9 weeks; Saturday baking for four weeks; laundering of own clothes for 6 weeks; canning of 12 quarts of peaches; preparation and serving of all meals for family of six for one week.

NEW YORK

Teachers College. The Summer Session has been a busy one in the development of research projects in the department of physiological chemistry. Work on the cabbage vitamin has proceeded and the results will soon be published in this Journal. Not only have definite conclusions been reached as to the effect of cookery upon the vitamin in this vegetable, which will be of value to the housewife, but much has been added to our knowledge of the conditions which affect this vitamin in general. The department will coöperate with the Canner's Research Laboratory to carry the studies into the field of canning.

Our studies in the field of vitamin B. have been advanced. During the coming year the department expects to make some definite contribution to the chemical nature of this substance. Dr. R. R. Williams has coöperated actively in this work.

Another piece of work that promises practical results of general value has been a series of studies on the relative nutritive value of white flour breads prepared by standard and modified recipes. In this work the department is uniting forces with Professor Rose and the department of nutrition.

Rena Eckman has completed the study of the peanut flour utilization as a source of protein and this combined with previous studies on vitamin content and recipe combinations is ready for publication.

The present policy of the School is proving most satisfactory in enlisting the coöperative efforts of the various departments of practical arts and in securing active participation of graduate students, who are thus enabled to have first hand contact with problems

that arise in this field. The variety of interest that this work arouses is also of value in the teaching development, for the students of regular courses are able to follow the experiments as observers even if they do not participate directly.

Budget Service in Banks. Fifty requests for admission were received by the Department of Household Economics at Teachers College, following its announcement of a Summer Session course of training for budget work in banks. Eighteen applicants were accepted, the majority being with a broad background of home economics training and experience. Banks in Minneapolis, Washington, New York and Waterville, Maine, arranged for women in their personal service departments to take the course, and several applicants were admitted because of exceptional qualifications of experience in banking or in social work.

All members of the group took the regular course in Budget Methods which has been given at the college for several years, and also a special series of fifteen lectures on problems of work in banks, arranged by coöperation with the Women's Division of the National Association of Savings Banks.

Ten hours a week were spent in field work under Personal Service Directors in four savings banks in New York, and twice a week these experiences were discussed at round table meetings.

The Savings Service Bureau, conducted by the class at Columbia for four days near the end of the Summer Session, provided a special opportunity for budget advising and for exhibition work. Observation of desirable methods of popular thrift instruction was made possible through public exhibits and demonstrations arranged on three successive days by the Departments of Household Administration, Textiles and Clothing, and Foods and Cookery.

In Hotel Management, August, 1922, Grace M. Aird describes the educational work with the employees of the Hotel Pennsylvania, New York. English is taught to the non-English speaking employees. The head of each department instructs every one of his workers. Both untrained and experienced workers are subject to constructive criticism of those whose business it is to make all departments efficient. Weekly meetings are held by the head housekeeper for the purpose of giving instruction in good taste and cleanliness. These meetings are supplemented by personal guidance and practical demonstrations for the training of chamber-maids and bath-maids, and by printed directions. Every service is standardized and an understanding of the dignity and importance of each piece of work is developed in the worker.

OHIO

The Ohio Home Economics Association will hold its first meeting of the year, Saturday, October 7, in the Women's Club Auditorium, Dayton, Ohio. The subject of the meeting is "Scientific Feeding of the Public." Mr. John Willy, Editor of the *Hotel Monthly*, is to be one of the speakers.

PENNSYLVANIA

Pennsylania State College. More than 50 courses in home management and allied subjects are to be given by the Department of Home Economics during the coming year. Among the subjects to be offered are primitive industries, elementary handwork, fine needle work, special methods and practice teaching, dress-making, dress design, millinery, clothing conservation, textiles, children's clothing, meal planning and serving, household finance, food preservation and demonstration cookery, child welfare and home nursing, history of cooking and table service, cookery and foods, nutrition, institutional housekeeping, school lunch, catering, cookery for men, institutional administration, dietetics, and methods of teaching vocational home economics.

In order that the Department of Home Economics, in common with the other schools and departments of the college, may be expanded, it is planned to develop the institution into the Pennsylvania State University, with facilities to accommodate 10,000 students.

TEXAS

A Cooperative Experiment. A dietetics class and a practice teaching class of the Home Economics Department, and the School of Public Health Nursing of the University of Texas have coöperated in a piece of work centering around the nutrition and health problems of a Mexican community. The problem has been attacked from two angles: the first, a nutrition class conducted by a group of Public Health nurses as part of the laboratory work of their class in dietetics; the second, a cooking class for mothers of children in the nutrition class, conducted by one of the practice teachers in the home economics department.

The nutrition class was made up of those children who were found to be 10 per cent or more underweight as determined by the public health nurses in their survey of the Mexican primary school. Twenty-two per cent of the children attending the school belonged in this group. The class was organized and conducted by the nurses taking dietetics, under the supervision of a member of the home economics department. The class work consisted of the teaching of better health and food habits through talks, stories, and charts. The children ranged from eight to thirteen years in age, but methods suitable for the youngest children proved most satisfactory for the group as a whole. The usual stories were modified when it was found that the Mexican children are unacquainted with fairies. The class work was followed up by visits to the homes. A record, as of "case work," was kept of these visits.

The work of the foods class for the mothers was outlined on the meal plan. The presence of several small children made necessary the adaptation of adult food for children, and there was more than one occasion to illustrate how children may be induced to eat foods which they had at first refused.

UTAH

Home Demonstration Work. The appointment in June of three district home demonstration agents by the college board of directors is an indication of the growth of home demonstration work in Utah. These agents are Lillian Elder, Katherine Adams, and Mrs. Christine B. Clayton. All three are graduates of the Utah Agricultural College, have taught for several years in Utah high schools, and have had experience in social group work of various types. The acquisition of additional workers at this period of financial depression is looked upon as a response to the genuine interest and demands of the women of the state for more home demonstration work. Organized and progressive project work has extended from five counties to seventeen counties within the space of two years.

NOTES

Ellen Brewer has accepted the position of Professor of Home Economics at Meredith College, Raleigh, N. C.

Lillian Brice is an instructor in household arts at Hood College, Frederick, Md.

Florence Churton, formerly of the University of Illinois, is an instructor in the Southern Branch of the University of California, Los Angeles.

Lucy Comfort is now an instructor in foods and cookery, Russell Sage College, Troy, N. Y.

Harriet Glendon is Assistant Professor at Margaret Morrison College, Carnegie Institute of Technology, Pittsburgh, Pa.

Mary Edna Groves has been appointed Supervisor of Home Economics in the Indian Schools of the United States. She is the first woman to hold this position. Her headquarters are Haskell Institute, Lawrence, Kansas.

S. Deborah Haines is head of the Department of Home Economics, State Normal College, Ypsilanti, Michigan.

Julia McIntyre is an instructor in home economics at the State Normal College, Ypsilanti, Michigan.

Helene Pope is the new head of the Department of Household Arts, University of Iowa, Iowa City, Iowa.

Edith Ranney has been appointed Assistant Professor of Home Economics, North Carolina College for Women, Greensboro, N. C

Child Health Program. The Commonwealth Fund has decided to finance a thorough child health program in three typical cities for a period of five years. The general qualifications of the first city to be selected are that it should be from 15,000 to 25,000 in population with an infant mortality of approximately 100 per 1000 live births or greater. The Committee has decided that the first city to be assisted in developing a thorough program for child health will be selected from the upper half of the Mississippi Valley region. The program will comprise safe-guarding the health of the mother-to-be, laying a good health foundation for children in the early sensitive and formative period of their growth and health supervision, and the formation of the essential health habits in school children. The responsibility for carrying out this child health program is placed upon the American Child Hygiene Association and the Child Health Organization of America.

The Committee in charge of general plans and policies say: "The work will be so developed as to enlist the coöperation of physicians, public health nurses, school nurses, and all other individuals and agencies interested in health and child welfare in the communities selected. The interest and coöperation of teachers in the school health program will be vital to the success of the undertaking. No fund can finance a health program in every nook and corner of the country, but if the cities in which the demonstrations take place devote every available resource to making them practical working programs for all communities, the Commonwealth Fund will have made possible a long step forward to bring health and happiness to every child.

Lantern Slide Lectures on Child Welfare. The National Child Welfare Association has arranged a series of lectures for presentation in meetings especially arranged for their use or in programs of regular gatherings under the auspices of churches, clubs, schools, community centers, health centers, settlements. The material for each lecture consists of fifty of the highest grade colored lantern slides, complete manuscripts, brief introductory address for use by the chairman of the meeting, directions for the most effective presentation of the slides, outlined newspaper announcements and press notices with which to arouse interest in the meeting. The first lecture is "Child Welfare—Everybody's Business," the second "Makers of American Ideals," and the third "Welfare or Warfare." Further information may be obtained from The National Child Welfare Association, 70 Fifth Avenue, New York City.

The Pan American International Committee of Women, created by the Women's Auxiliary Committee of the United States of the Second Pan American Scientific Congress will, for the first time, hold simultaneous meetings of its National Sections in the various capitals of North, Central, and South America on next Columbus Day, October 12, 1922. The call for these conferences, containing a suggested program, has been sent out from Washington by the Women's Auxiliary Committee of which Mrs. Charles Evans Hughes is Chairman. The aim of the conference is to further friendly relations and harmonious coöperation among the women of the Americas; to create a better understanding and a larger sympathy, thus placing international interests upon a more enduring basis.

The National Society for Vocational Education, the Vocational Educational Association of the Middle West, and the National Vocational Guidance Association will hold a Joint Vocational Education Convention at Detroit, Michigan, November 30–December 2. **The American Home Economics Association** will hold its mid-year meeting in connection with this convention. See also editorial, page 503.

FIFTH ANNUAL CONVENTION

AMERICAN DIETETIC ASSOCIATION

NEW WILLARD HOTEL, WASHINGTON, D. C., OCTOBER 16, 17, AND 18, 1922

MONDAY, OCTOBER 16

10:00 a. m. Educational Section, Dr. Ruth Wheeler presiding

The Dietitian—a History
Agnes O'Dea, Johns Hopkins Hospital
The Dietitian—A Statistical Study
Breta M. Luther, Cook County Hospital, Chicago
The Dietitian—A Prophecy
Ruth Wheeler, University of Iowa Medical College

2:00 p. m. Helene Pope, Margaret Morrison College, presiding

The Dietitian and the Diabetic
Dr. Elliot P. Joslin, Boston
A Nutrition Experiment in Industry
Laura Comstock, Eastman Kodak Company
Atmosphere and Personality in the Tea Room
Laura M. Piper, Manager, Laura Matilda Tea Room, New York City
Findings in China
Emma Gunther, Teachers College, Columbia University
Housewifery in China
Ray Balderson, Teachers College, Columbia University

7:00 p. m. Dinner Meeting, Mary de Garmo Bryan presiding

General Hugh Cumming, U. S. Public Health Service
Major Julia C. Stimson, Superintendent Army Nurse Corps, U. S. A.
Lenah Higbee, Superintendent Navy Nurse Corps, U. S. N.
Lucy Minnegerode, Superintendent of Nurses, U. S. Public Health Service

TUESDAY, OCTOBER 17

9:30 a. m. Dieto-Therapy Section, Rena Eckman presiding

The Role of High Protein in the Etiology of Nephritis
Dr. L. H. Newburg, University of Michigan Hospital
A Laboratory for the Preparation and Service of Research Diets
Dorothy N. Stewart, University of Michigan Hospital
Hospital Food Costs
Dr. Leroy E. Parkins, Peter Bent Brigham Hospital
Getting Food to the Patients
Henry C. Wright, Hospital and Institutional Bureau of Consultation, New York

2:00 p. m. Visits to Walter Reed General Hospital, and Office of Home Economics, U. S. Department of Agriculture

8:00 p. m. Octavia Hall, Peter Bent Brigham Hospital, presiding

Nutrition and Diet in Childhood
Mary S. Rose, Teachers College, Columbia University
The Relation of Hygiene to the Growing Child
Dr. Alfred Hess, New York City

WEDNESDAY, OCTOBER 18

10:00 a. m. Social Service Section, Gertrude G. Mudge presiding

Presentation of Committee Report
Gertrude G. Mudge, Chairman, Committee on Italian Dietary Survey
The Inter-relation of the Dietitian and the Medical Social Worker
Ida M. Cannon, Director of Social Service, Mass. General Hospital
Factors other than Food in the Nutrition Problem
Lucy Gillett, Director, Nutrition Bureau, A. I. C. P., New York City
Nutritional Activities in Philadelphia
Anna Louise De Planter, Work in Child Federation, Philadelphia
Psychological Aspects of Some Problems in Dietary Administration
Dr. John B. Watson, J. Walter Thompson Co., New York City

2:00 p. m. Mary de Garmo Bryan presiding

Hunger and Thirst
Dr. Walter Cannon, Professor of Physiology, Harvard Medical School
Business Meeting—Reports of Committees

8:00 p. m. All Member Program, Genevieve Field presiding

The Food Service for Private Patients
Lulu Graves, Director Dietary Dept., Mt. Sinai Hospital, New York City
The Food Service for Ward Patients
Marjory Hulsizer, Dietitian, Barnes Hospital, St. Louis
The Food Service for School Children
Daisy Treen, Director, School Lunch and New England Kitchen, Boston
The Food Service for the Hotel
Mary Lindsley, Manager, Grace Dodge Hotel, Washington

THURSDAY, OCTOBER 19

Johns Hopkins Hospital, Baltimore

10:00 a. m. Lulu Graves presiding

The Relation of Animal Experimentation to Dietetics
Dr. E. V. McCollum, Professor of Chemical Hygiene, Johns Hopkins Hospital
The Relation of the Medical Staff and Diet School in Johns Hopkins Hospital
Dr. William S. McCann, Associate Physician, Johns Hopkins Hospital

Afternoon in the hospital and clinic

The Washington Association is planning a number of social features and interesting trips for all persons attending the Convention. After the trips a picnic supper will be served by the Department of Agriculture and the Walter Reed Hospital on Tuesday afternoon. On Wednesday afternoon Mrs. John D. Rockefeller, Jr., assisted by Mrs. Coolidge, Mrs. Wallace, and Mrs. Cumming, will entertain at tea at the Grace Dodge Hotel.

On Thursday afternoon the Association will be the guests of the Johns Hopkins Hospital in Baltimore. After the morning program the afternoon will be spent in visiting the hospital and the medical clinic.

Efforts are being made to secure special rates, and information regarding transportation will be sent to all members of the Association.